

REMARKS

Claims 1-52 are pending. In the Office Action, claims 2, 13, 18, 25, and 32 were considered withdrawn. Claims 1, 3-12, 14-17, 19-24, 26-31, and 33-52 were rejected. Please reconsider the application in view of the amendments made above, the following remarks, and the accompanying Request to Amend Drawings.

I. Objection to Claims 21, 27, and 49

The Examiner objected to the drawings on grounds that claims 21, 27, and 49 were not shown in the drawings. A Request to Amend Drawings is submitted herewith, which proposes to add a new Figure 12A to resolve this objection. Herein, the specification is amended to accommodate the new drawing. No new matter is added, as the amendments are supported by the original Figs. 5A and 12, and the text in, e.g., paragraphs 0052-53 and 0062-66.

II. Rejections under 35 USC 112, ¶ 2

Claims 8, 23, and 24 were rejected under 35 USC 112, ¶ 2 due to a lack of antecedent basis for a claim term. These claims have been amended in a manner that is submitted to overcome the rejection. Claims 7, 8, 14, and 19 have been amended for similar reasons.

III. Rejection of Claims 1, 6-12, 14, 16, 17, 19, 23, 29, 30, 31 and 33 under 35 USC 103 over Tanaka '399 and Tanaka '053

Claims 1, 6-12, 14, 16, 17, 19, 23, 29, 30, 31, and 33 under 35 USC 103 over Tanaka (JP10135399) and Tanaka (JP 61170053) (hereinafter Tanaka '399 and Tanaka '053, respectively). The rejections are, respectfully, traversed.

A. Claim 1

Regarding claim 1, the Examiner agrees that neither Tanaka '399 nor Tanaka '053 includes the following underscored features of claim 1:

wherein a first subset of the leads each include a recess in the first surface of the lead at the inner end segment, a second subset of the leads each include a recess in the second surface of the lead at the inner end segment, and the individual leads of the first subset are situated in an alternating lateral pattern with the individual leads of the second subset such that the recesses in the inner end segments of the leads of each pair of adjacent leads are oriented in opposite directions.

The Examiner asserts, however, that "these limitations are inherent properties of the product of the combination of the applied prior art." The Examiner is in error.

Tanaka '399 (Fig. 1) teaches that alternating leads 19 should be provided with an identical-depth level difference 19a, and that the recesses of all of the level difference leads 19a should face upward in the same direction as the pads 23a, 23b of the active surface of the semiconductor 22. Paragraph 0016 of Tanaka '399 teaches that the level differences are formed by a half etch process in "regularity depth," i.e., identical recess depth.

Tanaka '053, on the other hand, teaches that all of the inner leads 2 should have identical-depth recesses, and that all of the recesses in the inner leads 2 should face in a common direction. In particular, in Figure 2, Tanaka '053 teaches that all of the recesses in the inner leads 2 should face upwards in the same direction as the active surface and pads of the semiconductor 7. In Figure 3, by contrast, Tanaka '053 teaches that all of the recesses in the inner leads 2 should face

downwards in the same direction as the inactive surface of the semiconductor 7.

Initially, the Examiner cannot combine Tanaka '399 with Tanaka '053 without rendering Tanaka '399 unsatisfactory for its intended purpose. See MPEP 2143.01. In particular, Tanaka '399 requires a level difference between the alternating inner leads 19a and 19b to prevent wire shorting. See paragraphs 0009-0010, 0043-0044, and 0048. Tanaka '399's intended purpose to avoid wire shorting would be eliminated in the combination, because Tanaka '053 teaches that all inner leads 2 should be identical and should have recesses that face in a common direction. That is, there would be no level difference between the inner leads in the combination. Accordingly, there is no suggestion or motivation to combine Tanaka '399 with Tanaka '053.

Further, the Examiner is in error in stating that the following features of claim 1 are "inherent properties of the product of the combination of applied prior art:"

... the individual leads of the first subset are situated in an alternating lateral pattern with the individual leads of the second subset such that the recesses in the inner end segments of the leads of each pair of adjacent leads are oriented in opposite directions.

"Inherency" requires that a feature "necessarily" be present, and the Examiner has not provided any reasoning to support his position that such features are inherent properties of the combination. See MPEP 2112 (IV). Accordingly, the rejection is not adequately supported, and if it is not withdrawn, it can only be repeated in a non-final Office Action that fully sets forth the Examiner's reasoning on inherency.

In any event, it is clear that this feature is not an inherent property of the combination, because Tanaka '053 teaches that all recesses in the inner leads 2 should face in a

common direction, either upward (Fig. 2) or downward (Fig. 3). Accordingly, in a combination, the Tanaka '399 and '053 embodiments converge on either Fig. 2 or Fig. 3 of the Tanaka '053, i.e., all recesses facing upward or all recesses facing downward, respectively. There simply is no suggestion, either in Tanaka '399 or Tanaka '053, to have leads wherein "recesses in the inner end segments of the leads of each pair of adjacent leads are oriented in opposite directions." In the combination, all would be oriented in a common direction.

Indeed, Tanaka '399 specifically addresses an alternative embodiment where all inner leads 19 are provided with an identical level difference 19a (see ¶ 0048), but Tanaka '399 never suggests the claimed feature that "recesses in the inner end segments of the leads of each pair of adjacent leads are oriented in opposite directions." This is further evidence of the non-obviousness of claim 1.

Therefore, the rejection of claim 1 is erroneous, and must be withdrawn.

B. Claims 9 and 29

Regarding claims 9 and 29, the Examiner admits that Tanaka '399 and Tanaka '053 do not show the following underlined portions of the claims:

wherein the recessed surfaces of the leads of each said pair of adjacent leads are spaced apart a first distance in a vertical direction, and said first distance is greater than a second distance in a horizontal direction between closest portions of the recessed surfaces of the leads of each said pair of adjacent leads.

In fact, both Tanaka '399 and Tanaka '053 teach a vertical "first distance" which is less than a horizontal "second distance", which is contrary to the terms of claims 9 and 29,

and contrary to the Examiner's assertion that this feature is inherent in the combination of Tanaka '399 and Tanaka '053. Accordingly, the rejection must be withdrawn.

In particular, Tanaka '399 gives an example of 0.1 mm as level difference 19a (see ¶ 0016), i.e., the "first distance" of the claim. Tanaka '399 does not state any examples of a "second distance," but it is clear from Tanaka '399's Fig. 1(b) that the horizontal spacing between the inner leads 19 (i.e., the pitch) is drawn to be greater than the vertical depth of the level difference 19a.

Tanaka '053 also is contrary to claims 9 and 29. That is, Tanaka '053's example gives a recess depth of 0.125 mm, i.e., the "first distance," but the inner leads 2 have a pitch i.e., the horizontal "second distance," of 0.25 mm, which is greater than the "first distance." Even if Tanaka '053 provided his inner leads 2 with a recess depth of 70% of the 0.25 mm plate thickness, i.e., 0.175 mm, that is still less than the horizontal pitch of 0.25 mm.

Accordingly, The Examiner cannot base a rejection of claims 9 and 29 on grounds that the above-cited terms are inherent or obvious, when both Tanaka '399 and Tanaka '053 are expressly contrary to the claims and the Examiner's combination.

Further, the Examiner's reliance on the doctrine of routine optimization is inapplicable to claims 9 and 29, because the claims focus on the relative size of the "first distance" and the "second distance," not to a specific value or range of either of these first and second distances.

Accordingly, the rejections of claims 9 and 23 must be withdrawn.

C. Claims 17 and 23

Similar to claim 1, claims 17 and 23 include the feature "wherein ... the recessed surfaces of the inner end segments of the leads of each of the pairs are oppositely oriented." Accordingly, it is submitted that the rejections of claims 17 and 23 are erroneous, and must be withdrawn, for the same reasons stated above for claim 1.

D. Claims 6-8, 10-12, 14, 16, 19, 30, 31, and 33

Claims 6-8, 10-12, 14, 16, 19, 30, 31, and 33 each depend on one of the above mentioned independent claims 1, 9, 19, 23, and 29, and hence the rejections thereof should be withdrawn for the same reasons stated for their respective underlying independent claims.

IV. Rejection of Claims 4, 5, 22, 28, 35, 40, 43, 46, and 52 under 35 USC 103 over Tanaka '399, Tanaka '053 and Tanigawa.

Claims 4, 5, 22, 28, 35, 40, 43, 46, and 52 were rejected under 35 USC 103 over Tanaka '399, Tanaka '053 and Tanigawa (JP03245560). These claims depend on one of the above-mentioned independent claims 1, 9, 17, 23, and 29, and hence the rejections thereof should be withdrawn for the same reasons stated for their respective underlying independent claims.

V. Rejection of Claims 36, 38, 41, 44, 47 and 50 under 35 USC 103 over Tanaka '399, Tanaka '053 and Miyamoto.

Claims 36, 38, 41, 44, 47 and 50 were rejected under 35 USC 103 over Tanaka '399, Tanaka '053 and Miyamoto (JP03024754). These rejections are, respectfully, traversed.

All of claims 36, 38, 41, 44, 47 and 50 depend on one of the above-mentioned independent claims, hence the rejections

should be withdrawn for the same reasons stated for their respective underlying independent claims.

Further, regarding claims 36, 38, 44, and 47, the rejection fails, because Miyamoto is logically incompatible with claims 1, 17, and 23, and with the Examiner's proposed combination of Tanaka '399 and Tanaka '053. In other words, there is no suggestion or motivation to make the proposed combination.

In particular, claims 36, 38, 44, and 47 each depend on depend on one of claims 1, 17 or 23. Recall that claim 1 includes the feature "that the recesses in the inner end segments of the leads of each pair of adjacent leads are oriented in opposite directions." Claims 17 and 23 each include a similar feature that "the recessed surfaces of the inner end segments of the leads of each of the pairs are oppositely oriented."

Miyamoto teaches to orient the respective recess 2a and tip 2b of all of the leads 2 in a same direction as the active surface and bond pads 3 of the semiconductor 3 so that point 7 of wire 4 will contact the tip 2b with a fulcrum effect during wire bonding to eliminate loop sag. This fulcrum effect obviously cannot occur if the recess 2a and tip 2b are oriented opposite to the bond pads and active surface of the leads, since the tip 2b would be facing in the wrong direction to be contacted by point 7 of wire 4 during wirebonding.

Therefore, since Miyamoto's asserted benefit of eliminating wire sag would be eliminated for all of the leads with downward facing recesses 2a and tips 2b, Miyamoto is incompatible with the feature of claims 1, 17, and 23 that that the recessed surfaces of the two leads of the lead pair are oppositely oriented, and with the Examiner's proposed combination of Tanaka '399 and Tanaka '053 to meet those claim terms. In other words,

the Examiner's rationale for combining Miyamoto with Tanaka '399 and Tanaka '053 is undercut.

Thus, the rejections of claims 36, 38, 44, and 47 must be withdrawn for this additional reason that there is no suggestion or motivation to combine Miyamoto with Tanaka '399 and Tanaka '053.

VI. Rejection of Claims 3, 15, 20, 26, and 34 under 35 USC 103 over Tanaka '399, Tanaka '053, Miyamoto, and Handa.

Claims 3, 15, 20, 26, and 34 were rejected under 35 USC 103 over Tanaka '399, Tanaka '053, Miyamoto, and Handa (JP59129451). These rejections are, respectfully, traversed.

All of claims 3, 15, 20, 26, and 34 depend on one of the above-mentioned independent claims 1, 9, 17, 23, and 29, hence the rejections should be withdrawn for the same reasons stated for their respective underlying independent claims.

Further, regarding claims 3, 20, and 26, the rejection of these claims is further traversed on grounds that Miyamoto is incompatible with, and cannot be combined with, Tanaka '399 and Tanaka '053, for the reasons stated above regarding claims 36, 38, 44, and 47 in Section V.

VII. Rejection of Claims 17, 20, and 21 under 35 USC 102(b) as Anticipated by Gursky

Claims 17, 20, and 21 were rejected under 35 USC 102 as anticipated by Gursky (USP 4,283,839).

This rejection is difficult to understand, because the Examiner cites to a "recessed surface 44" and to column 6, lines 5-30 and column 7, lines 20-44. But, no "recessed surface 44" or "recessed surface" is discussed in those portions of Gursky.

In fact, neither the reference number 44 nor the term "recessed surface" is used in the text Gursky's specification.

To be sure, a reference number 44 is shown in Fig. 5C, but there is no use the reference number 44 in the portions of the text relating to Fig. 5C. Assuming that the reference number 44 refers to the "grooves" mentioned at Gursky's col. 8, line 27 et seq., it is clear that those grooves have no relation to claim 17. In particular, claim 17 includes the features:

a plurality of adjacent pairs of leads each including an inner end segment beginning at an inner end of the lead, wherein the inner end segments each include a recessed surface, and the recessed surfaces of the inner end segments of the leads of each of the pairs are oppositely oriented.

Gursky lacks these features. The grooves [44?] of Gursky are not part of an "inner end segment" of Gursky's leads 28 of Figs. 2 and 5C, but rather are at the extreme outer end 34 of the leads 28 at the point of connection between the respective leads 28 and either the medial plane 25 or the structural margin 26. Moreover, the cross-sectional view of Gursky's leads 28, 30 (see Fig. 3) do not show any recessed surfaces of the type recited in claim 17 near free ends 36 of the leads 28, 30, much less "oppositely oriented" recessed surfaces.

Further, claim 17 requires "a plurality of adjacent pairs of leads." The Examiner identifies one of the leads of the pair as a long lead 28, and the other lead of the pair as a short lead 30. But, if each pair of leads includes one lead 28 and one lead 30, then there are no "adjacent pairs."

Accordingly, with respect to claim 17, the undersigned is at a loss in trying to figure out the rejection, especially in view of the Examiner's error in referring to a "recessed surface 44." This rejection should be withdrawn. If the rejection is

repeated, then the Examiner should provide a more accurate and complete discussion of his reasons in a non-final Office Action.

Claims 20 and 23 depend on claim 17, and the rejections of claims 20 and 23 should be withdrawn for the same reasons discussed above for claim 17.

Further, with respect to claim 20, beyond the recitation that the claimed leads include a "recessed surface," which Gursky lacks, the claim recites that one of each of "the adjacent pairs of leads" must "extend further toward a center of the leadframe than the other lead of the respective pair." The Examiner asserts that this feature is met because "lead 28 extends a greater distance toward the center than lead 30."

It is true, but irrelevant, that Gursky's "long leads 28" are longer than "short leads 30" (see col. 6, lines 27-28). Each of leads 28 and 30 couples to one of the chip pads 54 of chip 52, leads 28 and leads 30, and thus leads 28 and 30 extend the same distance onto to the center of the leadframe, i.e., each lead 28, 30 extends to be in position to contact one chip pad 54 of a straight row of chip pads 54 of the chip 52.

Accordingly, the rejection of claim 20 should be withdrawn for the additional reason that Gursky does not show pairs of leads where one lead of the pair extends "further toward a center of the leadframe than the other lead of the respective pair."

VIII. Rejection of Claims 23 and 27 under 35 USC 103 Over Gursky and Drees.

Claims 23 and 27 were rejected under 35 USC 103 as over Gursky in view of Drees (USP 4,02,608). The rejections are, respectfully, traversed.

Regarding claim 23, the claim includes the term "a plurality of adjacent pairs of leads each including an inner end

segment beginning at an inner end of the lead, wherein the inner end segments each include a recessed surface, and the recessed surfaces of the inner end segments of the leads of each of the pairs are oppositely oriented." This term is similar to a term appearing in claim 17. Accordingly, the rejection of claim 23 is traversed on grounds that Gursky does not show this feature, as discussed above for claim 17.

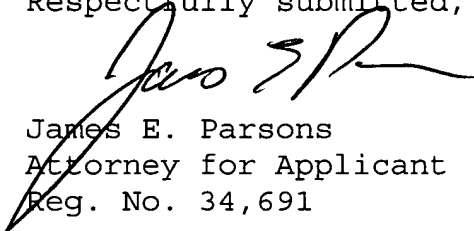
Claim 27 depends on claim 23, and the rejection should be withdrawn for the same reasons discussed above for claims 17 and 23.

CONCLUSION

It is submitted that the objections and rejections have either been resolved or proven erroneous. Accordingly, issuance of a Notice of Allowance is requested.

If there are any questions, please telephone the undersigned at (408) 451-5900 to expedite prosecution of this case.

Respectfully submitted,


James E. Parsons
Attorney for Applicant
Reg. No. 34,691

Customer No.: 022888

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8/19/2004 
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